

**REMARKS**

A marked-up version of amended paragraphs in the specification and amended claims are included herewith in Appendix A.

**Fees Payable**

Four new dependent claims are added beyond the number for which a fee has previously been paid, resulting in an added claims fee of \$36.00.

A check in the amount of \$36.00 is submitted herewith in payment of the added claims fee. The U.S. Patent and Trademark Office is hereby authorized to charge any additional amount necessary to the entry of this amendment, and to credit any excess payment, to Deposit Account No. 08-3284 of Intellectual Property/Technology Law.

It is requested that the examination and prosecution of this application proceed on the basis of claims 1-24 setforth hereinabove.

Respectfully submitted,



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## APPENDIX A

### In the Specification

On page 2, please amend the first, second, third and fourth paragraphs to read as follows:

The present invention is based on applicant's findings that the gene XAP-5 localized in X-chromosomal manner has a partner gene which is localized in autosomal fashion and is expressed in many tissues. For example, the expression can be found in the testicles, it being here especially strong in spermatogenesis, in particular in the stages of primary and secondary spermatocytes as well as the round spermatocytes. The partner gene is referred to as X5L and is localized in the human genome on chromosome 6 in the region 6pter. Applicant isolated and characterized X5L on the PAC clone LLNLp 704K12294Q13. The DNA comprises a coding sequence and an intron and results in an about 1.6 kb long cDNA. It codes for an approximately 37 kD long spermatogenesis protein comprising 325 amino acids and referred to as X5L protein (*cf.* figures 1, 2 (SEQ ID NO: 1, 2, and 3) and 5, 6). Applicant also found out that mutations in the X5L protein may impair spermatogenesis.

According to the invention applicant's findings are utilized to provide a spermatogenesis protein (X5L protein) comprising the amino acid sequence of figure 1 (SEQ ID NO: 2) or an amino acid sequence differing therefrom by one or several amino acids, a homology of at least 70 % being present between the latter amino acid sequence and the amino acid sequence of figure 1 (SEQ ID NO: 2).

The expression "an amino acid sequence differing by one or several amino acids comprises any amino acid sequence coding for an X5L protein and having a homology of at least 80 % with respect to that of figure 1 (SEQ ID NO: 2). The amino acid sequence may differ from that of figure 1 (SEQ ID NO: 2) by additions, deletions,

substitutions and/or inversions of individual amino acids. In particular, the amino acid sequence may be that of figure 3 (SEQ ID NO: 5).

Another subject matter of the present invention is a nucleic acid which codes for an X5L protein. The nucleic acid may be an RNA or a DNA, e.g. a cDNA. A DNA is preferred which comprises the following:

(a) The DNA of figure 1 (SEQ ID NO: 1) or a DNA differing therefrom by one or more base pairs, the latter DNA hybridizing with the DNA of figure 1 (SEQ ID NO: 1) and coding for an X5L protein whose amino acid sequence has a homology of at least 80 % to that of figure 1 (SEQ ID NO: 2), or

(b) a DNA related to the DNA of (a) via the degenerated genetic code.

On page 3, please amend the second paragraph to read as follows:

The expression "a DNA differing by one or more base pairs" comprises any DNA sequence coding for an X5L protein, which hybridizes with the DNA of figure 1 (SEQ ID NO: 1) and codes for an X5L protein whose amino acid sequence has a homology of at least 80 % to that of figure 1 (SEQ ID NO: 2). The DNA sequence may differ from the DNA of figure 1 by additions, deletions, substitutions and/or inversions of individual base pairs. In particular, the DNA sequence may be that of figures 2 to 4 (SEQ ID NO: 3, 4, 5 and 6). The expression "hybridization" refers to hybridization under common conditions, in particular at 20°C below the melting point of the DNA sequence.

On page 7, please amend the first, second, third and fourth paragraphs to read as follows:

Figure 1 shows the DNA (SEQ ID NO: 1) and amino acid sequences of a spermatogenesis protein (SEQ ID NO: 2) according to

the invention which comprises 325 amino acids (X5L protein). The DNA sequence is a human cDNA.

Figure 2 shows the sequences of a genomic DNA coding for an X5L protein (SEQ ID NO: 3). The DNA originates from the human genome. The cDNA of figure 1 starts at the -739 base pair. An intron is present between base pairs 828 and 1129. A polyadenylation site is found at the 2658 base pair.

Figure 3 shows the DNA (SEQ ID NO: 4) and amino acid sequences of an X5L protein (SEQ ID NO: 5) comprising 334 amino acids. The DNA sequence is a mouse cDNA.

Figure 4 shows the sequence of a genomic DNA coding for an X5L protein. The DNA originates from the mouse genome. The cDNA of figure 3 starts at the 445 base pair of figure 4 (A) (SEQ ID NO: 6). An intron is present between the base pairs 492-1232 of figure 4 (A). An intron is present between base pairs 1-1136 of figure 4(B) (SEQ ID NO: 7). A polyadenylation sequence is found at the 2306 base pair of figure 4(B).

### **In the Claims**

Please amend claims 1-11 to read as follows:

1. A spermatogenesis protein, comprising the amino acid sequence of [fig. 1] SEQ ID NO: 2 or an amino acid sequence differing therefrom by one or more amino acids, wherein a homology of at least 80% exists between the latter amino acid sequence and that of [fig. 1] SEQ ID NO: 2.
2. The spermatogenesis protein according to claim 1, comprising the amino acid sequence of [fig. 3] SEQ ID NO: 5.

3. A, DNA coding for the spermatogenesis protein [according to claim 1], comprising:
  - (a) the DNA of [fig. 1] SEQ ID NO: 1 or a DNA differing therefrom by one or more base pairs, the latter DNA hybridizing with the DNA of [fig. 1] SEQ ID NO: 1 and coding for a spermatogenesis protein whose amino acid sequence has a homology of at least 80% to that of [fig. 1] SEQ ID NO: 2, or
  - (b) a DNA related to the DNA from (a) via the degenerated genetic code.
4. The DNA according to claim 3, wherein the latter DNA is selected from the group consisting of SEQ ID NO: 3, SEQ ID NO: 4, SEQ ID NO: 6, SEQ ID NO: 7 [that of fig.2, fig. 3, or fig. 4].
5. An expression plasmid, comprising the DNA according to claim 3 [or 4].
8. Antibodies directed against the spermatogenesis protein according to claim 1 [or 2].
9. Use of the spermatogenesis protein according to claim 1 [or 2 or a DNA according to claim 3 or 4] for studying or influencing spermatogenesis.